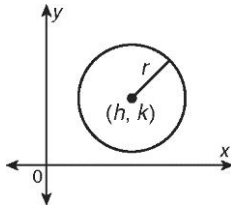
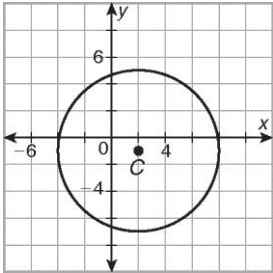


**Geometry Notes Section 12-7**  
**Circles in the Coordinate Plane**

Equation of a Circle	
The equation of a circle with center $(h, k)$ and radius $r$ is $(x - h)^2 + (y - k)^2 = r^2$ .	

**Write the equation of circle C with center C(2, -1) and radius 6.**

$(x - h)^2 + (y - k)^2 = r^2$	Equation of a circle
$(x - 2)^2 + (y - (-1))^2 = 6^2$	Substitute 2 for $h$ , -1 for $k$ , and 6 for $r$ .
$(x - 2)^2 + (y + 1)^2 = 36$	Simplify.



You can also write the equation of a circle if you know the center and one point on the circle.

**Write the equation of circle L that has center L(3, 7) and passes through (1, 7).**

**Step 1** Find the radius.

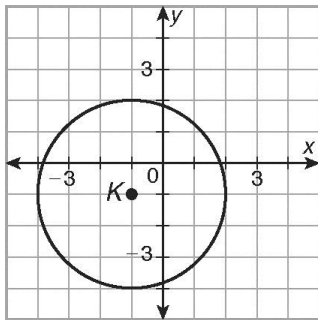
$r = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	Distance Formula
$r = \sqrt{(1 - 3)^2 + (7 - 7)^2}$	Substitution
$r = \sqrt{4} = 2$	Simplify.

**Step 2** Use the equation of a circle.

$(x - h)^2 + (y - k)^2 = r^2$	Equation of a circle
$(x - 3)^2 + (y - 7)^2 = 2^2$	$(h, k) = (3, 7)$
$(x - 3)^2 + (y - 7)^2 = 4$	Simplify.

**Write the equation of each circle.**

1.



2. Circle B that passes through (-2, 6) and has center (-6, 3).

You can use an equation to graph a circle by making a table or by identifying its center and radius.

**Graph  $(x - 1)^2 + (y + 4)^2 = 9$ .**

The equation of the given circle can be rewritten.

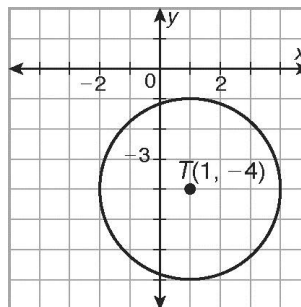
$$(x - h)^2 + (y - k)^2 = r^2$$

$$\downarrow \quad \quad \downarrow \quad \quad \downarrow$$

$$(x - 1)^2 + (y - (-4))^2 = 3^2$$

$$h = 1, k = -4, \text{ and } r = 3$$

The center is at  $(h, k)$  or  $(1, -4)$ , and the radius is 3. Plot the point  $(1, -4)$ . Then graph a circle having this center and radius 3.



**Graph each equation.**

3.  $(x + 1)^2 + (y - 2)^2 = 16$

4.  $x^2 + (y + 3)^2 = 4$

